AF IAP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: **Gleeson, et al.**

Application No.: **10/609,115** Examiner: **DI GRAZIO, Jeanne A.**

Filed: **June 27, 2003** Docket No.: **KNST 2 00019 (KSU.P0213)**

For: **ELECTRO-CONVECTIVE DIFFRACTIVE DEVICE**

MAIL STOP APPEAL BRIEF – PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Dear Sir:

Applicant transmits herewith one (1) originally signed copy of the APPEAL BRIEF UNDER 37 C.F.R. § 41.37 for the above-identified patent application.

Payment for the filing of this Appeal Brief and any appropriate extension of time fees are authorized to be charged to a Credit Card. **The appropriate PTO form 2038 is enclosed.** If the Credit Card is unable to be charged, please charge any and all fees or credit any overpayment to Deposit Account No. 06-0308.

Respectfully submitted,
FAY, SHARPE, FAGAN,
MINNICH & McKEE, LLP

Sept 13, 2006
Date

Joseph E. Waters, Reg. No. 50,427
1100 Superior Avenue, Seventh Floor
Cleveland, OH 44114-2579
216-861-5582

CERTIFICATE OF FIRST CLASS MAILING

I hereby certify that this paper and/or fee is being deposited with the United States Postal Service as First Class Mail service and is addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Cathryn Terchek
Cathryn Terchek

Date Sept. 13 2006

N:\KNST\200019\CNT0003675V001.doc

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S)	:	Gleeson, et al.
TITLE	:	ELECTRO-CONVECTIVE DIFFRACTIVE DEVICE
APPLICATION NO.	:	10/609,115
FILED	:	June 27, 2003
CONFIRMATION NO.	:	8164
EXAMINER	:	DI GRAZIO, Jeanne A.
ART UNIT	:	2871
LAST OFFICE ACTION	:	February 22, 2006
ATTORNEY DOCKET NO.	:	KNST 200019 (KSU.P0213)

APPEAL BRIEF UNDER 37 C.F.R. §41.37

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

09/19/2006 WASFAW1 00000043 10609115
01 FC:1402 500.00 OP

Dear Sir:

This Appeal Brief is in furtherance of the Notice of Appeal mailed to the U.S. Patent and Trademark Office on July 17, 2006.

The fees required under 37 C.F.R. §41.20(b)(2) and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying Transmittal of Appeal Brief.

Appellant files herewith an Appeal Brief in connection with the above-identified application wherein claims 1-7 were finally rejected in the Final Office Action of February 22, 2006.

CERTIFICATE OF FIRST CLASS MAILING

I hereby certify that this paper and/or fee is being deposited with the United States Postal Service as First Class Mail service and is addressed to Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Cathryn Terchek

Date: Sept 13 2006

Cathryn Terchek

I. REAL PARTY IN INTEREST (37 C.F.R. §41.37(c)(1)(i))

The real parties in interest in this appeal are the inventors named in the caption of this brief (James T. Gleeson and Joshua S. Martin) and the assignee of their interests, Kent State University.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. §41.37(c)(1)(ii))

Currently, it is believed that there are no other appeals or interferences in process or pending before the U.S. Patent and Trademark Office which the present application bases its priority from, or any cases which base their priority upon the present application, that will directly affect, or will be directly affected by, or will have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. §41.37(c)(1)(iii))

The status of the claims set forth after the final office action mailed July 13, 2005 was, and is, as follows:

Allowed:	none
Rejected Claims:	1-7

The present appeal is directed specifically to claims 1-7.

IV. STATUS OF THE AMENDMENT (37 C.F.R. §41.37(c)(1)(iv))

No amendments have been made that have not been entered by the Examiner.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER (37 C.F.R. §41.37(c)(1)(v))

There are two independent claims pending in the application, claims 1 and 4.

Claim 1 is directed to a tunable diffraction grating comprising a cell with a first cell wall spaced from a second cell wall; electrodes disposed on facing surfaces of the first and second cell walls; and an array of nematic liquid crystal convective rolls, wherein the convective rolls are arranged periodically in a space between the first cell wall and second cell walls; and a polymeric network stabilizing

the array of nematic liquid crystal convective rolls (page 3, lines 10-14, also see Figure 3).

Claim 4 is directed to a method for producing a diffraction grating comprising the steps of: introducing a polymerizable mixture including nematic liquid crystal, dopant, and polymerizable precursor between two electrically conductive substrates; applying a potential difference across the polymerizable mixture to cause the nematic liquid crystal to assemble into an array of convective rolls; and stabilizing the convective roll structure by forming a polymer network from the polymerizable precursor, wherein the polymer network is bounded by the convective roll structure (page 3, lines 15-21, no Figures are directed to this claim).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R. §41.37(c)(1)(vi))

The Examiner rejected claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,122,024 to Molsen et al. ("Molsen").

VII. ARGUMENTS (37 C.F.R. §41.37(c)(1)(vii))

The Examiner has rejected claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,122,024 to Molsen et al. ("Molsen"). Appellants respectfully traverse the rejection as follows.

A. The §103 Rejection

Molsen is directed to a switchable liquid crystal device including a cell containing a helical polymer network and a nematic liquid crystal, and including electrodes are provided for applying a field across the cell to switch between different optical states. A "mask" may be used to during the polymer network forming stage to form multiple "picture elements" having different helical pitches. As described with reference to Figures 1-3, a light absorbing layer 7 is used to absorb light that is transmitted through the cell.

Despite the Examiner's assertions, Molsen is related to the present invention in only the most general of ways. In this respect, the Examiner states in

the office action that "As to claim 1, Molsen is drawn to a switchable liquid crystal devices. Molsen teaches and discloses, in reference to Figure 1, a cell defined between alignment layers...with a first cell wall...spaced from a second cell wall...electrodes disposed on facing surfaces...of the first and second walls." Appellants submit that the above statement accurately describes ANY switchable liquid crystal cell device. That is, the Examiner is simply stating that Molsen teaches the most basic structure of a liquid crystal cell and then goes not to state that Molsen "does not explicitly specify in so many words" the most important limitations of the present invention. Appellants submit that it is precisely these features that Molsen "does not explicitly specify" that differentiate and render the present invention novel. The Examiner appears to be attempting to gloss over these features while emphasizing the most basic features of Molsen (i.e. first and second substrates with electrodes thereon) that it shares in common with almost EVERY OTHER PRIOR ART SWITCHABLE LC CELL.

In this regard, Molsen does teach a liquid crystal device having polymer walls, with an electric field used to switch the optical state. However, as pointed out in the prior Response, a device such as taught by Molson is NOT a diffraction grating. Such a device could only function as a diffraction grating if the polymer network follows a periodic structure. The only way such a structure could be produced in the device of Molsen would be by applying a light absorbing layer to the cell prior to polymerization. The present device, on the other hand, does not utilize a light absorbing layer. Rather, the periodic array of convection rolls, which functions as a diffraction grating, arises spontaneously upon application of the electric field.

Furthermore, and as previously pointed out, a diffraction array made according to Molson would NEVER be tunable (as recited in our claim 1, i.e. "a tunable diffraction grating") because the periodicity of any diffraction grating thus formed must be specified by the light absorbing layer (as detailed above) which cannot be changed after it is in place. In contrast, and as detailed on page 8, lines 3-16 of the application, both the grating constant and the structure factor can be tuned in the present invention, with the structure factor tunable after formation of the

polymeric network by varying the application of the electric field. The Examiner cannot simply ignore the limitation that the present diffraction grating is tunable.

The Examiner admits that Molson does not disclose forming "an array of liquid crystal rolls", which is by far the most important difference between the present invention and Molson. The similarities the Examiner points out in the subsequent paragraph of page 4 of the Office Action are essentially details common to any number of liquid crystal devices.

For example, the Examiner notes that "Molsen does in fact teach and disclose...means for switching the cell between a first optical state and a second optical state different from the first." However, the Examiner will appreciate that these two optical states are a reflective and a non-reflective mode (see col. 5 generally). Neither of these states corresponds to the diffraction grating function of the present invention.

With regard to the Examiner's position that it would be obvious to form the convective rolls in the invention of Molsen, Appellants continue to disagree with this argument. In fact, one would never "form said array of convective rolls at least for the reasons as set forth in Molson" to form a broadband reflector. In this respect, one skilled in the art of liquid crystals would immediately recognize that the reflective properties of the invention taught by Molson come from the helices induced in the liquid crystal, whereas the selective reflective properties of the present invention come from the periodic array of the convective rolls.

Molsen's teaching does not extend to causing the convective rolls to form. The Examiner appears to be taking the position that Molsen would inherently possess an array of convective rolls because it has a polymerizable mixture and a switching means in the cell. In this respect however, the Examiner is simply incorrect in her statement that it may be understood to one skilled in the art that there is an array of convective rolls in the invention of Molsen. Rather, said rolls only form with the appropriate choice of nematic liquid crystal properties, as detailed on page 5, lines 8-14 of the present application, and appropriate choice of frequency and amplitude of the applied electric field. Molsen give no indication that that these appropriate materials and conditions are a concern or that such rolls are subsequently formed.

As the Board will appreciate however, inherency must be a necessary result, not merely a possible result. *In re Oelrich*, 212 USPQ 323 (CCPA 1981); *Ex parte Keith*, 154 USPQ 320 (POBA 1961). See also, *In re Robertson*, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999).

In relying on a theory of inherency, the Examiner must provide a basis in fact or technical reasoning to support the determination that the allegedly inherent characteristics *necessarily* flow from the teachings of the prior art. *Ex parte Levy*, 17 USPQ2d 1461 (BPAI 1990). Here, the Examiner has failed in this burden of showing that Molsen would *necessarily* have convective rolls. That is, as detailed above, said rolls only form with the appropriate choice of nematic liquid crystal properties, as detailed on page 5, lines 8-14 of the present application, and appropriate choice of frequency and amplitude of the applied electric field. Molsen neither discloses nor suggest such an appropriate selection of parameters to produce such convective rolls.

In the "Response to Arguments" section of the office action, the Examiner makes a confusing statement that "it is noted that the features upon which Appellant relies...are not recited in the rejected claim(s)...Appellant has not claimed the necessary critical properties and frequency and amplitude for the formation of said rolls."

Appellants deny this assertion. However, Appellants further submit that regardless of the truth of the assertion that the properties under which the rolls are formed are not claimed, it has ABSOLUTELY NO bearing on the present §103 rejection. That is, Appellants have claimed a device having an array of convective rolls. As shown, such rolls are not inherent in any switchable LC cell having a polymerized mixture, but instead are only formed under the appropriate conditions. Molsen not only fails to disclose or suggest such rolls, it fails to disclose or suggest these conditions. Thus, the feature upon which the Appellant relies (i.e. an array of convective rolls) ARE recited in the claims.

If the Examiner believed that the conditions under which the rolls are formed need to be in the claims (an assertion the Appellants deny), then the proper rejection would have been under §112, NOT §103. Molsen simply fails to disclose or

suggest the convective rolls or the conditions under which such rolls form. Thus, a prior art rejection under §103 is inappropriate and must be withdrawn.

B. Conclusion

In view of the above, Appellant respectfully submits that claims 1-7 are in condition for allowance.

Accordingly, it is respectfully requested that the Examiner's rejections be reversed.

Respectfully submitted,

FAY, SHARPE, FAGAN
MINNICH & McKEE, LLP

Dated: Sept 12, 2006

Joseph E. Waters, Reg. No. 50,427
1100 Superior Ave., 7th Floor
Cleveland, Ohio 44114
(216) 861-5582

L:\JEW\DATA\KNST\200019\appealbrief.doc

VIII. APPENDIX OF CLAIMS (37 C.F.R. §41.37(c)(1)(viii))

1. A tunable diffraction grating comprising:

a cell with a first cell wall spaced from a second cell wall;

electrodes disposed on facing surfaces of the first and second cell walls; and

an array of nematic liquid crystal convective rolls, wherein said convective rolls are arranged periodically in a space between said first cell wall and said second cell wall; and

a polymeric network stabilizing said array of nematic liquid crystal convective rolls.

2. The tunable diffraction grating of claim 1, wherein the convective rolls are arranged with a grating constant spacing approximately twice the separation distance between said first and second cell walls.

3. The tunable diffraction grating of claim 1, further comprising:

a power source connected to said electrodes to apply an electric field, wherein said convective rolls are arranged with a structure factor, and said structure factor is adjusted by application of an electric field though said power source.

4. A method for producing a diffraction grating comprising the steps of:

introducing a polymerizable mixture including nematic liquid crystal, dopant, and polymerizable precursor between two electrically conductive substrates;

applying a potential difference across the polymerizable mixture to cause the nematic liquid crystal to assemble into an array of convective rolls; and

stabilizing the convective roll structure by forming a polymer network from the polymerizable precursor, wherein the polymer network is bounded by the convective roll structure.

5. The method according to claim 4, wherein the polymerizable mixture further includes an initiator, said initiator being activated in said step of stablizing to initiate the formation of the polymer network from the polymerizable precursor.

6. The method according to claim 5, wherein the initiator is a photoinitiator and said step of stabilizing includes photoinitiation of the photoinitiator.

7. The method according to claim 4, wherein said convective rolls are arranged with a structure factor after said step of stabilizing, and the method further comprises, after said step of stabilizing:

adjusting the structure factor by application of an electric field though at least one of the electrically conductive substrates.

IX. EVIDENCE APPENDIX (37 C.F.R. §41.37(c)(1)(ix))

There was no evidence submitted under 37 C.F.R. §§1.130, 1.131, or 1.132 or any other evidence entered by the Examiner during prosecution of the application and relied upon by Appellant in the Appeal.

X. RELATED PROCEEDINGS APPENDIX (37 C.F.R. §41.37(c)(1)(x))

As noted in section II above, there are believed to be no related appeals, interferences or judicial proceedings which are related to, directly affect or be directly affected by, or have a bearing on the Board's decision in the pending appeal.